

REMARKS

This responds to the Advisory Office Action mailed on July 20, 2006 and is subsequent to the Request for Continued Examination (RCE) filing on August 4, 2006.

Claims 1, 3-13 and 23-33 are pending in this application.

§102 Rejection of the Claims

Claims 1, 3, 4, 11 and 12 were rejected under 35 USC § 102(e) as being anticipated by Wachtler et al. (U.S. 6,274,391). The Applicant respectfully traverses the rejection and requests the Office to consider the following.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." (*Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), M.P.E.P. §2131, 8th Ed., Rev. 4).

Claim 1 has the limitation of

a thermally conductive material adhering said at least one
microelectronic die back surface to said recess bottom surface.

The Advisory Action, mailed July 20, 2006 asserts:

Wachtler, states "[s]emiconductor device 16 is secure within cavity 14 of substrate 12 by ADHESIVEIf adhesive is used, the die attach material may ...be THERMALLY CONDUCTIVE" (col. 8, lines 53-57). Emphasis added. Thus, Wachtler clearly anticipates the limitation in question.

That a die-attach material is adhesive does not mean Wachtler teaches the limitations of claim 1. That a die-attach material may be thermally conductive also does not mean Wachtler teaches the limitations of claim 1.

But Applicant respectfully requests the Office to show where Wachtler expressly or inherently teaches the limitations of claim 1, set forth above.

Regarding an express teaching, it is clear that Wachtler does not expressly teach “*adhering* said at least one microelectronic die *back surface* to said *recess bottom surface*.” (Claim 1, emphases added).

Regarding an inherent teaching, as Applicant has demonstrated, every chance Wachtler takes to reveal an inherent teaching of claim 1, he teaches away from the limitations of claim 1. Applicant will repeat the traversals that were not addressed in the “REPLY FILED ON 05 JULY 2006” (Advisory Action mailed July 20 2006).

Applicant respectfully requests the Office to respond to Applicant’s assertions that there is no inherent teaching by Wachtler to teach all the limitations of claim 1.

The ***Response to Arguments***, proffered in the Final Office Action, states that “Wachtler et al. clearly teaches that the die is attached to the bottom surface of the recess (14).” (Final Office Action at page 3). Applicant respectfully disagrees.

Wachtler provides at least five teachings that lead away from what is claimed, and thus provide an inherent teaching that there is no adhesive between Wachtler’s die backside and the cavity. And Wachtler only shows a gap on the edges for his adhesive, and none at the back surface.

First, Wachtler teaches that the “primary thermal path for the semiconductor device 16 is to the air which is very short because the semiconductor device is attached directly to the substrate or packaging 12”. (Wachtler at column 8, lines 18 et seq). “Attached directly” implies nothing is therebetween. This reveals an inherent teaching that teaches away from what is claimed. Applicant respectfully requests the Office to address this teaching of Wachtler, which teaches away from using an adhesive anywhere but on the edges of Wachtler’s die and not on the back of Wachtler’s die.

Second, Wachtler, who is vitally interested to “optimize heat dissipation” (Wachtler at column 2, line 26), teaches that “[i]f adhesive material is used, the die attach material may ... be ... thermally non-conductive.” (Wachtler at column 8, lines 56-57). Thus, adhesive material may not be used, but if it is, it may be thermally non-conductive. This teaching militates further away from inserting the adhesive between the die 16 and the substrate 12, but not in the gaps as he teaches. This reveals an inherent teaching that teaches away from what is claimed. Applicant respectfully requests the Office to address this teaching of Wachtler, which teaches away from

using an adhesive anywhere but on the edges of Wachtler's die and not on the back of Wachtler's die.

Third, Wachtler states and illustrates, and Wachtler only teaches that the "adhesive material may or may not fill the gap between the edge of the semiconductor device 16 and the cavity 14". (Wachtler et al. at col. 8, lines 60-61). This, accompanied with his teaching of "if adhesive material is used" (*supra*), further militates against teaching what is claimed. This reveals an inherent teaching that teaches away from what is claimed. The Final Office Action states that "the figures of Wachtler et al. are not drawn to scale." (Final Office Action at page 3). But the only reference Wachtler makes for "not to scale" is with respect to FIG. 18, not the junction of items 12 and 16. Applicant respectfully requests the Office to address this teaching of Wachtler, which teaches away from using an adhesive anywhere but on the edges of Wachtler's die and not on the back of Wachtler's die.

Fourth, Wachtler illustrates no space for an adhesive between structure 18 and structure 16 at the backside surface thereof. This reveals an inherent teaching that teaches away from what is claimed. Applicant respectfully requests the Office to address this teaching of Wachtler, which teaches away from using an adhesive anywhere but on the edges of Wachtler's die and not on the back of Wachtler's die. But Wachtler does show a gap on the edges for his adhesive.

And fifth, Wachtler teaches that the "surface of semiconductive device 16 opposite cavity 14 should contain the bond pads of the die and be flush with the surface of the substrate 12" (Wachtler at column 8, lines 64 et seq). This indicates an adhesive therebetween would make a "flush" match of surfaces problematic or impossible, but an adhesive at the edges that may or may not fill the gaps, does not make "flush with the surface of the substrate 12" (Id.) problematic or impossible. This reveals an inherent teaching that teaches away from what is claimed. Applicant respectfully requests the Office to address this teaching of Wachtler, which teaches away from using an adhesive anywhere but on the edges of Wachtler's die and not on the back of Wachtler's die.

Wachtler therefore fails, both expressly and inherently, to teach what is claimed regarding "a thermally conductive material *adhering* said at least one microelectronic die *back surface* to said recess *bottom surface*". (Claim 1, emphases added). Because "[t]he identical invention [is not] shown in as complete detail as is contained in the ... claim" (*Richardson*,

supra), Wachtler et al. does not anticipate claim 1. Withdrawal of the rejections is respectfully requested.

The previous Advisory Action adds the following assertions:

(1) “Wachtler teaches that the semiconductor device (16) is secured within cavity (14) of substrate (12) by adhesive means [col. 8, lines 54-55].” Applicant does not dispute this, rather, that Wachtler does not teach the limitation of claim 1, “adhering said at least one microelectronic die back surface to said recess bottom surface”.

(2) “Wachtler further clarifies that his adhesive is formed into said cavity before said semiconductor device is placed in the cavity [col. 13, lines 63-65].” Applicant traverses this teaching as non-enabling and further as inoperative according to 35 USC 101. Claim 6 (col. 13, lines 63-65) depends from claim 5, which has the extreme limitation of “the dimensions of said cavity match the dimensions of the semiconductor device.” (Claim 5). But claim 1 has already restricted the structure to require the “thin film overlay on said surface of said semiconductor device and on a surface of said substrate adjacent and substantially parallel with said surface of said semiconductor device ...” (Claim 1). Consequently, any adhesive first placed into the cavity (Claim 6) renders the above limitation of claim 1 impossible, and therefore inoperative. There is no teaching in the body of the specification to resolve this inoperative teaching in claims 5 and 6.

(3) The previous Advisory Action quotes from an external source (Merriam-Webster’s Collegiate Dictionary 10th Ed.) to attempt to heal the lack of teaching in Wachtler commensurate with claim 1. But it is inappropriate to proffer extrinsic evidence, particularly when intrinsic evidence teaches to the contrary of the specification. Phillips v. AWH Corp., 376 F.3d 1382 (Fed. Cir. July 21, 2004, cited in MPEP 2111.01). Phillips also settles the issue that the specification is always highly relevant to claim construction and is the single best guide to the meaning of a claim term in dispute. Phillips also settles the issue that it is appropriate to rely heavily on the written description for guidance as to the meaning of the claims. Consequently, where Wachtler teaches at least five inherent reasons why no adhesive is applied to the back of the die 16 (as articulated previously by Applicant, and as repeated below), the Wachtler does not anticipate claim 1.

(4) The previous Advisory Action states “it is noted that nowhere in the disclosure Wachtler discloses that the drawings are to scale.” Applicant respectfully but strenuously disagrees. Wachtler only disclaims as “not to scale” with respect to FIG. 18. Consequently, where Wachtler only disclaimed one figure is as “not to scale”, the implication for all other figures is that they are to scale. Absent Wachtler having a global disclaimer of “not to scale” and in the presence of Wachtler’s single disclaimer for a single figure (FIG. 18), as “not to scale”, the implication favors the interpretation that all other drawings are to scale, and where no structure is illustrated between the cavity floor 14 and the die 16, Wachtler inherently, teaches away from claim 1.

(5) “[A]pplicant is implying that Wachtler fails to teach a thermally conductive adhesive material.” Applicant did not imply as much. What Wachtler teaches is that “[i]f adhesive material is used” (Wachtler at column 8, line 56), which inherently implies it may not be used. But Wachtler, who is vitally interested to “optimize heat dissipation” (Wachtler at column 2, line 26), teaches that “[i]f adhesive material is used, the die attach material may ... be ... thermally non-conductive.” (Wachtler at column 8, lines 56-57). Thus, adhesive material may not be used, but if it is, it may be thermally non-conductive, which would destroy Wachtler’s invention if attached to the back of the die 16.

§103 Rejection of the Claims

Claim 6 was rejected under 35 USC § 103(a) as being unpatentable over Wachtler et al. in view of Shibamoto et al. (U.S. 6,563,212). Applicant respectfully traverses the rejection and requests the Office to consider the following.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's

disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). (M.P.E.P. § 2143 8th Ed, Rev.1).


Claim 6 depends from claim 1. Wachtler et al. only teaches that the “adhesive material may or may not fill the gap between the edge of the semiconductor device 16 and the cavity 14” (Wachtler et al. at col. 8, lines 60-61), and Wachtler et al. illustrates no space for an adhesive between structure 18 and structure 16 at the backside surface thereof. Thus, although Shibamoto may teach various adhesives, they cannot be located where claim 6 requires. Shibamoto has nothing to do with “a heat spreader having a first surface, said heat spreader having at least one recess defined therein by at least one sidewall extending from said heat spreader first surface to a recess bottom surface” (Claim 1, from which claim 6 depends). Withdrawal of the rejections is respectfully requested.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant’s attorney, John Greaves at (801) 278-9171, or Applicant’s below-named representative to facilitate the prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,
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